

Health Policy and Exercise: A Brief BRFSS Study and Recommendations

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The Behavioral Risk Factor Surveillance Survey is used to compare three predictors of self-rated health, specifically exercise, tobacco smoking, and a diagnosis of diabetes (a proxy for obesity). Exercise is found to be the best predictor, and the remainder of the article discusses the role of exercise in disease prevention and the all-important concept of exercise adherence. Government policy in the future needs to promote exercise adherence in a more rigorous way, because it is a key to both individual and societal health. Exercise habits need to be instilled from youth, and physical education requirements in school need to be re-established at all levels through high school. Adults also need encouragement with better neighborhood planning of exercise trails for walking and biking, as well as planned community activities to encourage fitness through one's lifetime. The article concludes with six recommendations for formal government action to encourage exercise adherence.

Keywords: Behavioral Risk Factor Surveillance Survey; exercise; health policy

Health policy in the United States has emphasized system changes in important programs like Medicare and Medicaid but has not paid sufficient attention to health promotion and disease prevention at the individual level. This article highlights the important role of exercise in health promotion and the need for more formal policies that require and facilitate healthy habits for Americans. The purpose of this article is, first,

to analyze three major correlates of health and determine their relative strength in predicting health. This is accomplished through the analysis of Behavioral Risk Factor Surveillance Survey (BRFSS) data. Second, the article focuses on the influence of exercise and the difficult task of promoting exercise adherence in the population through formal health policies.

► **THE BRFSS STUDY**

The BRFSS is a yearly U.S. survey performed in the 50 states, the District of Columbia, and U.S. possessions (Virgin Islands and Guam). It is the largest telephone survey in the world. The survey analyzes self-rated health in the population, as well as limited variables that are judged to be behavioral risk factors. For example, tobacco use, exercise, and diabetes are three major variables included in the survey. This study analyzes self-rated health as a dependent variable and uses these three variables as predictors using multiple regression.

Exercise is related to self-rated health, as numerous studies cited in this article will attest. Tobacco use is considered the number-one public health hazard in the United States and is the subject of numerous warnings by the Surgeon General. And diabetes is a good proxy measure for obesity, which is also a major health risk for Americans. But which of these factors is most related to self-rated health?

Table 1 presents a correlation matrix with Pearson's r values for the three variables and self-rated health. The questions in the BRFSS survey are worded:

1. How is your general health? (excellent, very good, good, fair, poor)
2. During the past month, did you participate in any physical activities? (yes, no)
3. Adults who are current smokers. (yes, no)
4. Have you ever been told by a doctor that you have diabetes? (yes, no)

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TABLE 1
Correlation of BRFSS Question Categories

	1	2	3	4	5	6	7	8	9	10	11
1. Excellent health	1										
2. Very good health	0.49	1									
3. Good health	-0.66	-0.61	1								
4. Fair health	-0.59	-0.93	-0.55	1							
5. Poor health	-0.62	-0.43	0.13	0.39	1						
6. Exercise	0.57	0.87	-0.50	-0.86	-0.54	1					
7. No exercise	-0.57	-0.87	0.50	0.86	0.54	-1	1				
8. Smoker	-0.37	0.14	-0.08	-0.10	0.56	-0.06	0.06	1			
9. Nonsmoker	0.37	-0.14	0.08	0.10	-0.56	0.06	-0.06	-0.99	1		
10. Diabetes	-0.52	-0.69	0.34	0.67	0.63	-0.74	0.74	0.18	-0.18	1	
11. No diabetes.	0.51	0.73	-0.38	-0.70	-0.62	0.75	-0.75	-0.11	0.11	-0.97	1

SOURCE: Compiled by author from CDC data (www.cdc.gov/brfss).

TABLE 2
Predictors of Self-Rated Health

	<i>Y = Excellent Health</i>			
	<i>Coefficients</i>	<i>SE</i>	<i>T</i>	<i>p</i>
Exercise	0.24	0.09	2.71	.009
Nonsmoker	0.23	0.08	2.96	.005
No diabetes	0.27	0.31	0.86	0.39
	<i>Y = Very Good Health</i>			
	<i>Coefficients</i>	<i>SE</i>	<i>T</i>	<i>p</i>
Exercise	0.59	0.08	7.51	1.19E-09
Nonsmoker	-0.23	0.07	-3.28	.002
No diabetes	0.63	0.28	2.27	.03

Compiled by author from CDC data (www.cdc.gov/brfss)

NOTE: Y = Excellent Health, $R^2 = 0.44$, Adjusted $R = 0.40$, $SE = 2.07$; Y=Very Good Health, $R^2 = 0.81$; Adjusted $R = 0.80$, $SE = 1.85$.

The correlation matrix results demonstrate that exercise is more highly correlated with self-rated health than with tobacco use or a diagnosis of diabetes. Correlations are particularly high for those rating their health as “very good” (positive correlation exceeding 0.8) or only “fair” (negative correlation exceeding -0.8).

Table 2 presents multiple regression results, using the three predictor variables. Results are presented for rating of “excellent” and “very good” health, and for only one category (yes or no) for each predictor variable. Once again, exercise is the best predictor of self-rated health

among the three variables. The results are particularly strong for those rating their health as “very good.”

This study is limited to 1 year of BRFSS data and, therefore, is not conclusive. But it is one more study that illustrates the importance of exercise relative to other factors affecting individual health. The remainder of this article focuses on exercise, and how it might become more institutionalized as a part of U.S. health policy.

► EXERCISE AND DISEASE PREVENTION

The popular literature on health promotion recently has become critical of diets to achieve weight loss and has suggested that exercise may be the best mechanism for health promotion. Exercise has the virtue of being a continuous form of health promotion, as opposed to on-and-off diet regimens that Americans have engaged in as fad diets come and go. The diet industry in the United States is extremely profitable, but it has not significantly improved the health of the population. Most diets result in full weight regain in 2 to 5 years, but those who exercise “are much more likely to keep weight off” (Gledhill, 2001, p. 443). Diet and exercise have been combined traditionally as dual means to keep off excess weight and promote health, but a growing literature indicates the independent beneficial contribution of exercise alone.

The most obvious benefit of exercise is to cardiovascular health. Wessel et al. (2004) report that among women undergoing coronary angiography, higher self-reported physical fitness scores are associated with fewer coronary artery disease risk factors and lower risk for adverse cardiovascular events. Beckerman, Magadle, Weiner, and Weiner (2005) find that among

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patients with chronic obstructive pulmonary disease, exercise to increase muscle strength “can decrease the use of health services and hospitalization days” (p. 3,177). Simon (2005), in a review of 22 studies of cardiovascular disease and exercise, discovered that only moderate exercise is “credited with 18 to 84 percent reductions in the risk of heart disease and 18 to 50 percent reductions in the overall mortality rate” (p. 75). Moderate exercise in the form of simply walking an hour every week can reduce the risk of sudden cardiac death by 73%. One can enjoy “big benefits from small changes” (Simon, 2005, p. 75).

As one ages, weight gain is inevitable. Williams and Wood (2005) report that age-related weight gain occurs even among the most physically active adults as they age. In theory, exercise must increase as one ages to prevent weight gain, but in practice, this is difficult to achieve. It is better to accept moderate weight gain as one ages, while using exercise to prevent obesity, diabetes, and other dangerous medical conditions associated with weight gain. Among men older than 65, regular vigorous exercise is associated with reduced risk of mortality from prostate cancer (Smith & McFall, 2005). It slows the progression of the disease through mechanisms not currently understood by science. Exercise also benefits the musculoskeletal system and prevents or forestalls diseases that come with the aging process. Physical activity benefits bone density, which prevents life-threatening fractures among the elderly. Exercise helps to prevent frailty, especially in combination with social and environmental factors that keep a person active (Woo, Goggins, Sham, & Ho, 2005).

Exercise also prevents other forms of disease in all ages. Physical activity can significantly reduce the risk of “diabetes, some forms of cancer, osteoporosis, obesity, fall and fractures, and some mental health problems” (Bruckner & Brown, 2005, p. 538). Various forms of cancer can be prevented through exercise. Studies show that

among postmenopausal women, increased physical activity reduces the risk for breast cancer. McTiernan et al (2003) report that exercise of longer duration provides the most benefit. Bruce, Fries, and Lubeck (2005) find that running and other aerobic exercise reduce musculoskeletal pain by 25%, compared with a sedentary group in a longitudinal study.

Finally, exercise is beneficial in preventing certain mental health problems. Chang et al (2005) find that regular exercise among adults of all ages reduces psychosocial distress in all its forms. The National Institute of Mental Health reports that exercise is associated with “a decreased level of mild to moderate depression, a lessening of anxiety levels, decline in stress, a reduction in neuroticism and an increase in self-esteem and well being” (Gledhill, 2001, p. 439). Among the elderly, it helps to reduce depression (Shin and Kim, 2005), increase cognitive function (Weuve, Kang, Manson, Ware, & Grodstein, 2004), and delay the progression of Alzheimer disease (AD). In the case of AD, Teri et al (2003) report that a home-based exercise program, combined with teaching behavioral management techniques to caregivers, improves not only physical health but also reduces depression. This not only relieves symptoms but also delays institutionalization of AD patients.

Often, the elderly are less concerned with exercise and disease prevention than with other more immediate needs. For example, Tannenbaum et al. (2005) find that older women are concerned primarily with issues such as preventing memory loss, dealing with the side effects of medication, and correcting vision impairment. They are least concerned with receiving counseling about exercise, even though this may prevent some of these and other problems.

► EXERCISE ADHERENCE

If exercise is so beneficial, why is it so hard to maintain over the years? White, Ransdell, Vener, and Flour (2005) note that about “50% of individuals who start an exercise program withdraw within 6 months” (p. 23). And even those who maintain an exercise program for a year may fall back into sedentary patterns. Physicians, researchers, and policy makers need to spend more time focusing on how to “get sedentary individuals to become more active” (Blair & Church, 2004, p. 1,233) and to stay active.

Getting the Sedentary Moving

Exercise habits should begin in childhood. A study in Norway found that physical activity in childhood increases to about age 13, then begins to decline (Sogaard, Bo, Klungland, & Jacobsen, 2005). In a

Danish study of children aged 11 to 15, higher levels of exercise are associated with the following factors: “high social class, strong social integration in the peer group, easy contact with parents and friends, physical exercise among parents and best friends, high degree of life satisfaction, and good health” (Holstein, Ito, & Due, 1990, p. 2721). In a U.S. study using qualitative research, exercise was studied from the viewpoint of teacher-parent-child relationships. To promote exercise among students, teachers need to counsel students on cooperating with parents to achieve fitness goals. Parents need to support healthy lifestyles at home and learn to talk about exercise habits in positive and encouraging ways. And children need direct messages from both parents and teachers to motivate them to change exercise habits (Carmeli, 2003).

Among adults, one way to get the sedentary moving is through medical supervision. Michels and Kugler (1998) find that those who are told by their doctors to exercise are more likely to engage in regular activity. But physicians do not normally recommend exercise unless the patient has a high body mass index. Merely being sedentary is not enough (Kreuter, Scharff, Brennan, & Lukwago, 1997). Duncan et al (2005) report that exercise counseling with a prescription for walking produces “significant long-term improvements in cardiorespiratory fitness” (pp. 2362-2363) among sedentary adults of various ages. Exercise adherence is enhanced when the level and intensity of exercise is chosen by the participant. Parfitt, Rose, and Burgess (2006) find that when one can self-select the level of intensity for exercise (usually lower), then positive affective responses are more likely. In other words, you tend to like exercise more if you can select your own pace and type of exercise.

McDevitt, Wilbur, Kogan, and Briller (2005) report similar findings for adults with psychiatric problems. Outpatients in psychiatric rehabilitation were prescribed walking regimes according to their level of fitness. Overall, they walked at a lower level than prescribed, but 87% completed the exercise program with success. Among special groups with psychiatric problems, self-selection of exercise intensity appears important for adherence.

Studies report that exercise adherence for sedentary elderly populations is improved by both medical supervision and tailoring the exercise to the population in question. A “Green Prescription” physical activity counseling program was used successfully in a community-dwelling elderly population in New Zealand. In the United States, a Tai Chi exercise program was used to encourage exercise adherence among elderly Asian-Americans in California. The sedentary population had high rates of adherence

TABLE 3
Variables Predicting Exercise Dropout

Personal–smoker, inactive leisure time, inactive occupation, blue collar worker, Type A personality, increased physical strength, poor credit rating, overweight, poor self-image, depressed, hypochondriacal, anxious, low ego strength
Program factors–inconvenient time and location, excessive cost, high intensity exercise, lack of exercise variety, exercises alone, lack of positive feedback, inflexible exercise goals, poor exercise leadership
Other factors–lack of spouse support, inclement weather, excessive job travel, injury medical problems, job change and move
Good adherence from positive variables–instruction and encouragement, regular routine, freedom from injury, enjoyment from variety, group camaraderie, progress testing and recording, spouse and peer approval
Poor adherence from negative variables–inadequate leadership, time inconvenience, musculoskeletal problems, exercise boredom, individual commitment, lack of progress awareness, spouse and peer disapproval

Source: Adapted from Franklin, Barry, “Program factors that influence exercise adherence: Practical adherence skills for the clinical staff.” Dishman, Rod (Ed.) *Exercise Adherence: Its Impact on Public Health*. Champaign, IL: Human Kinetics Books, 1988.

(87%) to the culturally relevant exercise program, which was a low-tech, low-cost alternative to other forms of exercise (Taylor-Piliae, Haskell, & Sivarajan Froelicher, 2005).

Once sedentary individuals get moving, the challenge is to keep them moving. Franklin (1988) notes there are many factors that prevent exercise adherence. As you can see in Table 3, there are personal factors, such as an inactive occupation and Type A personality, as well as program factors, such as high intensity exercise and lack of exercise variety. Good adherence to an exercise program is influenced by factors such as regular exercise routine, enjoyment from variety, progress recording, freedom from injury, and spousal approval. Spousal approval is particularly important and helpful, as studies show spouses share common lifestyle habits and health risks. You are more likely to exercise if your spouse does, and you are also more likely to share common diseases, such as asthma, high blood pressure, and coronary heart disease (Jurj et al., 2005) as well.

These general factors affect exercise adherence, but what about specific types of exercise? What type is best suited to which individual?

Types of Exercise

For the most part, an individual should choose the type of exercise that he or she enjoys the most. But what if they do not know where to start? Abernethy, Hanrahan, Kippers, MacKinnon, & Pandy (2005) believe that personality may affect the enjoyment of exercise. If one is extraverted, then group exercise may be more enjoyable, whereas introverts “may adhere better to individual, home-based exercise programs” (Abernethy et al., 2005, p. 293).

Kirkpatrick, Hebert, and Bartholomew (2005) point out that exercise adherence may be improved by not exercising, but rather engaging in a sport. In a study of college students, they found that participants in sports reported more intrinsic motives, such as the enjoyment or challenge of the sport, as opposed to those who engage in exercise for more extrinsic motives, such as better appearance, or stress and weight management. They suggest that the more positive motives led to better adherence over time. One may enjoy the sport of golf, tennis, horseback riding, and so forth without having to summon the self-discipline to engage in exercise. Communities can take an active role by making more sporting activities available and promoting sport competitions to make them more enjoyable.

But sometimes sports cannot be enjoyed on a regular basis (e.g., one may be confined to a single round of golf once a week). This is certainly better than no exercise at all (avoid the golf cart), but what about the rest of the week? We all want to know the minimum amount of exercise required for us to stay healthy. This seems to be part of human nature, because most of us do not enjoy exercise. Lee (2003) acknowledges this and compares two standards: the Centers for Disease Control/American College of Sports Medicine (CDC/ACSM) standard and the Institute of Medicine (IOM) standard. The CDC/ACSM standard is 30 min of moderate-intensity physical activity for most days of the week. The IOM standard is 60 min of the same (e.g., brisk walking). Lee (2003) concludes that the 30-min standard is the most appropriate for physicians to recommend to patients, given the beneficial effects of the lesser amount of time. In the background is the issue of exercise adherence; it is simply easier to maintain a 30 minute regimen. Yet only about 25% of American adults currently meet that standard (Fenton, 2005).

Of the various types of exercise, walking seems the easiest to begin and maintain over a long period of time. In a study of various forms of exercise, Bassett and Strath (2002) found that walking is more popular than other common forms of exercise: jogging, calisthenics, weight lifting, swimming, cycling, tennis, golf, and bowling. Regular walking can be encouraged by the physical characteristics of neighborhoods and

places of work. Bauman, Sallis, and Owen (2002) cite various factors such as the presence of sidewalks, tree cover, and the characteristics of nearby parks as promoting more walking, as well as jogging and cycling. Fenton (2005) notes the need to promote bicycle and pedestrian-friendly settings through four factors: more compact neighborhoods with mixed land uses, networks of trails and bike lanes, intelligent site designs that welcome cyclists and walkers, and a feeling of safety that encourages people to exit their cars. The issue of safety is particularly important to new exercisers who are not accustomed to using walking trails in their neighborhoods (Gordon, Zizzi, & Pauline, 2004).

Men and women have similar and differing motivations for walking. Humpel, Owen, Iverson, Leslie, and Bauman (2004) report that among both women and men, those who walked most did not perceive weather as inhibiting their walking. But there were some gender differences. Men were more likely to walk if they had positive neighborhood aesthetics, whereas women were more likely to walk when accessibility to walking areas was a positive factor.

Many Americans limit their physical activity to chores around the house. Matthews (2002) studied the most common physical activities of a sample of American adults and found that the most common activities over a 2-week period (in order of frequency) were shopping, light housework, preparing food, laundry, dishwashing, stair climbing, heavy housework, and lawn mowing. Although many of these are useful forms of exercise, they often do not provide sufficient exertion to promote cardiovascular fitness. Something more is needed.

Gledhill (2001) suggests that a variety of exercises is needed to maintain fitness. Endurance exercises are needed to strengthen the heart and lungs and prevent stroke and diabetes. She recommends brisk walking for older adults. Strength exercises also are needed, even among the elderly, to maintain strength and prevent frailty. She recommends the use of weights for that purpose. Balance exercises are particularly important for the elderly to prevent falls, and a simple exercise is standing on one leg. Finally, flexibility exercises are needed to maintain well-being and prevent falls and injuries among the elderly. Simple stretching exercises can accomplish this.

► CONCLUSION

Exercise is a key not only to longevity but also to avoiding disease and simply feeling good. The limited literature in this article indicates that very little exercise each week—as little as 60 min of walking each week—can provide great benefits. Healthcare professionals advise more

exercise than that, but recommending too much can have the deleterious effect of discouraging sedentary individuals from getting off the couch. The exercise prescription needs to be tailored to individual needs and predilections.

How can government or communities craft policies that lead to more exercise and better health in the population? The following recommendations provide a blueprint for action:

1. Required physical education classes through high school—These classes used to be required, and because they have been abolished, Americans have been more unfit and less disciplined. There is a growing number of studies demonstrating the link between physical activity and academic achievement (Coatsworth & Conroy, 2007; McKensie, 2007; Zhang, Middlestadt, & Ji, 2007).
2. More effort to recruit college students to engage in forms of exercise, such as intramural sports—During college, students tend to rebel against things they were forced to do by parents and teachers in high school. This is a time when sports and fun forms of exercise need to be required by colleges, to promote fitness and to help students to develop more friendships during a time when social isolation occurs. Government funding to encourage intramural sports in college may help to get the ball rolling, as well as changes in policies in the college community.
3. An organizational culture in the public and private sectors that encourages employees to exercise during the workday—It needs to start with government organizations and should emulate the successful practices of other nations, such as Japan. This is perhaps the most difficult of all the recommendations to achieve, particularly in an American culture that stresses individualism. Walking trails around the workplace might be an attractive inducement to exercise, as well as group activities.
4. Better planning of neighborhoods by urban planners to include exercise trails that are convenient and aesthetically pleasing—Research shows that convenience and beauty of exercise trails for walking, jogging, and biking are what draw people to exercise before and after work, and on weekends. State and city codes should require that developers of new neighborhoods have this type of mandatory planning. Currently existing neighborhoods and parks should receive funding to develop exercise trails as well.
5. More encouragement of group sports by voluntary organizations in the community, such as churches and community groups—This might include community sports competitions, such as Olympics by age groups, with prizes, and so forth. This could provide an outlet for

more extraverted types who like group sports, with participation by families and other groups. Government grants and contracts may help communities and organizations in developing these programs.

6. More research on exercise adherence and the psychology of those who exercise throughout their lives—Although we know something about the characteristics of those who exercise, we lack knowledge about how others can become that way, or if it is even possible for others to change. It may be that the sedentary mentality needs different forms of motivation.

In conclusion, government needs to be more proactive in creating an environment that promotes exercise among Americans. It needs to attack those factors in society that encourage us to be lazy and unhealthy. Although individual freedom is important, government policy needs to be aggressive in fighting a culture that has become, for lack of a more subtle phrase, undisciplined and self-indulgent.

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